REMARKS

Claims 12-15 are being amended to correct a minor error, by replacing "one or more compounds are" with "compound is". This amendment introduces no new matter, and is being made so that the dependent claims derive proper antecedent basis from claim 11.

Claims 35, 36, 51 and 52 were objected to because of multiple dependency. Claims 35, 36, 51 and 52 are being amended to remove the multiple dependency and Applicant submits that they are now in condition for allowance.

Rejections under 35 U.S.C. § 102(e)

Claims 11-17, 19-21, 23-30, 32-34, 37-43, 45-47, 49-50 and 53-56 were rejected under 35 U.S.C. 102 (e) as being anticipated by Wheland et al., U.S. Patent No. 6,824,930 ("Wheland"). This rejection is respectfully traversed.

Applicant respectfully points out to the Examiner that the compositions disclosed in Wheland are polymers. The Examiner's attention is respectfully directed to In contrast, the compositions used in the presently claimed processes are not polymers but rather are non-polymeric species including: cyclic, linear, or branched hydrofluorocarbons having 2 to 10 carbon atoms. Applicant respectfully asserts that none of the compositions disclosed in Wheland meet all of the limitations recited in the present claims. Furthermore, none of the compositions claimed in the instant application are polymers. Applicant respectfully directs the Examiner to the definition of the term "polymer" from Grant and Hackh's Chemical Dictionary, fifth edition, a copy of which is enclosed herewith. According to Grant and Hackh a polymer is "A substance composed of very large molecules consisting essentially of recurring long chain structural units that distinguish polymers from other types of organic molecules, and confer on them tensile strength, deformability, elasticity, and hardness." Applicant further directs the Examiner's attention to the enclosed copy of the definition of the term "polymer" from Hawley's Condensed Chemical Dictionary, fourteenth edition. According to Hawley a polymer is "A macromolecule formed by the *chemical union of five or more identical* combining units called monomers."(emphasis added). Thus according to Hawley a polymer must be produced by polymerization of at least five or more identical units. Applicant respectfully submits that none of the compounds claimed in the instant invention were formed by the polymerization of five or more identical monomers. Furthermore, were one to possibly identify a repeat unit in one or another of the instantly claimed compounds, any 5-mer or greater of that repeat unit would have too many carbons to meet the limitations recited in the instant claims. Accordingly, Applicant submits that

a person of ordinary skill in the art would not be led to the presently claimed invention by Wheland, which is clearly directed to polymeric compounds.

In view of the foregoing, Applicant submits that the present claims are not anticipated by or obvious in view of Wheland.

Rejections under 35 U.S.C. § 103 (a)

As an initial matter with regard to the rejections under 35 U.S.C. § 103, Applicant points out to the Examiner that Wheland and the present application were under common ownership (assigned to E. I. du Pont de Nemours and Company) at the time the present invention was made. Accordingly, pursuant to 35 U.S.C. § 103 (a), Wheland cannot properly be used as prior art to reject the present claims under 35 U.S.C. § 103. Applicant therefore respectfully submits that the rejection of the present claims over either Deviny, U.S. Patent No. 4,975,300 in combination with Wheland or Hatzakis et al., U.S. Patent No. 4,678,850 is not proper. Nevertheless, in the interests of completeness and advancement of prosecution of the present application, the present rejections under 35 U.S.C. § 103 are addressed hereinbelow.

Claims 18, 31 and 44 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Wheland in view of Deviny, U.S. Patent No. 4,975,300 ("Deviny"). This rejection is respectfully traversed.

The Examiner asserts that although Wheland does not disclose perfluoro-N-methylmorpholine, Deviny discloses a photoactive perfluorochemical liquid that is perfluoro-4-methylmorpholine, and that it would be obvious to a skilled artisan to employ perfluoro-N-methylmorpholine in the processes disclosed by Wheland because, the Examiner alleges, Deviny discloses that perfluoro-N-methylmorpholine, is "cost effective as an immersion fluid composition". Applicant respectfully disagrees with the Examiner's characterization of the disclosure of Deviny at column 8, lines 1-4. Deviny is directed to a method for curing an organic coating and discloses compositions used in the method. At column 7, lines 65-68, Deviny explains that coatings were heated by immersion in saturated vapor. The text cited by the Examiner, from an example of the simultaneous use of condensation heating and UV to cure a diacrylate resin, merely states that "immersion in the perfluorinated vapor continued during UV exposure". Applicant points out that the "immersion" referred to in Applicant's specification is not used for heating, but is related to processes such as immersion lithography. As stated in Applicant's specification, on page 3, lines 12-14, in "immersion lithography, the optical source, the target surface, or the entire lithographic apparatus is immersed in a highly transparent high refractive index liquid." Applicant submits that even if the teachings of Deviny were combined with those of Wheland, one of ordinary skill in the art would not be led by such combination to the presently claimed invention, because Wheland discloses the use

of certain fluorinated compounds as monomers for use in making the polymers of Wheland. The present claims are not directed to polymers.

Claims 22 and 48 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Wheland in view of Hatzakis et al., U.S. Patent No. 4,678,850 ("Hatzakis"). This rejection is respectfully traversed.

The Examiner asserts that the "difference between the claims and Wheland is that Wheland does not disclose that the compound is subjected to freeze-thaw fractional distillation". However, as discussed above, Applicant submits that there are other differences between the present claims and the disclosure of Wheland- in particular, that Wheland is directed to polymers and the present claims are not. Hatzakis is also directed to polymers, namely poly(halogenated) styrene, for use as resist materials. Thus, Applicant submits that even if a person of ordinary skill in the art were to combine the teachings of Wheland with those of Hatzakis, such combination would not anticipate or suggest the presently claimed invention.

CONCLUSION

Applicant submits that all of the pending claims are patentable and in condition for allowance. Accordingly, withdrawal of the rejections and allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

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GRANT & HACKH'S

CHEMICAL DICTIONARY

[American, International, European and British Usage]

Containing the Words Generally Used in Chemistry, and Many of the Terms Used in the Related Sciences of Physics, Medicine, Engineering, Biology, Pharmacy, Astrophysics, Agriculture, Mineralogy, etc.

Based on Recent Scientific Literature

FIFTH EDITION
Completely Revised and Edited by

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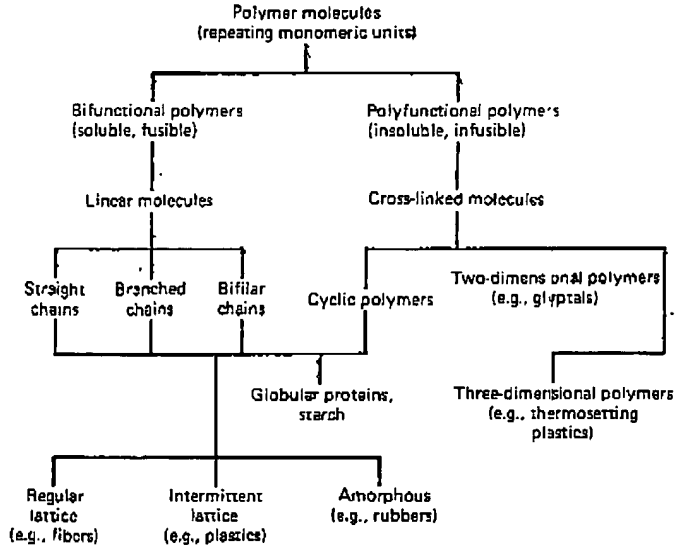

Fig. 18. Classification of polymer molecules.

polyhydric Polyol. A compound containing more than 2 hydroxyl groups.

polyhydrone $(H_2O)_n$. A polymer of *hydrone*, q.v.

polyisobutylene* PIB*. Poly(1,1-dimethylethylene). The polymer $(-CMe_2 \cdot CH_2-)_n$.

polymer Polymere, polymeride (obsolete). A member of a series of polymeric compounds. A substance composed of very large molecules consisting essentially of recurring long-chain structural units that distinguish polymers from other types of organic molecules, and confer on them tensile strength, deformability, elasticity, and hardness. Monomers, largely derived from coal and oil, are used to build up such polymers. Considerable modification of properties results on introducing a second type of monomer (B) into the main structure (monomer A), producing a *copolymer*, in which the units A and B are arranged completely at random. Alternatively, the A and B units may be arranged in order of long segments, e.g., ~A—A—A—A—B—B—B—B—B—A—A—A—A~(*block* p.). There are also *branched* polymers, in which the B units branch from the A units; and *cross-linked* polymers, in which 2 A chains are joined by one or a block of B units. Polymeric molecules are classified above in Fig. 18 (after Pinner). Examples of *high* polymers are plastics, fibers, elastomers, human tissue. Cf. *macromolecular chemistry*.

alloy ~ A p. produced by the simultaneous polymerization of 2 substances. Cf. *silicone alloy*. blocked ~ See above. branched-chain ~ See above. co~ A composite p. prepared by the polymerization of a mixture of 2 or more monomers, or of a monomer and p. of low molecular weight. Cf. alloy *polymer*. block ~ A p. built of linearly linked polymeric units. random ~ A p. having 2 or more types of units combined in random succession in a linear-chain structure. cross-linked ~ See above. electron-exchange ~ Redox p. A polymeric structure having several sites capable of accepting or donating electrons. Thus, modified cellulose with redox properties is used as a catalyst to remove oxygen from water to obtain anaerobic conditions. graft ~ A p. produced by grafting a monomer onto a straight-chain p. to produce a branched-chain p. Thus, a fluorocarbon p. is heated sufficiently to form free radicals on its surface and then dipped into a monomer, e.g., styrene, to produce a graft p. having a printable surface. high ~ A p. of high molecular weight, e.g., containing a large number of structural units. high-trans ~ A rubbery p. in which a large proportion of the C atoms are arranged in a definite pattern that repeats itself consistently in the chain; as, natural rubber. homo ~ See *tactic polymer* below. inorganic ~ Inorganic p. structures formed on heating or by catalytic action; as, mica, silicones, inorganic rubber. irregular ~ A p. with more than one type of repeating unit. isotactic ~ A crystalline p. made from 1-alkenes, in which the substituents in the asymmetric C atoms all have the same configuration relative to the main chain. linear ~ A p. in which the molecules are essentially in the form of long chains. organized ~ A p. having a regular macroscopic structure, without necessarily showing microcrystallinity. Cf. *polyallomers*. orientated ~ A p. film that has been stretched mechanically in 2 directions at right angles to improve its strength properties. redox ~ Electron-exchange p. regular ~ Tactic p. super ~ A p. in which the polymerized molecules have an average molecular weight exceeding 10,000. tactic ~ A p. with only one type of repeating unit. See *tacticity*.

P.R. Trade name for a polyamide synthetic fiber.

polymeric Related molecularly to an isomeric compound, but having a multiple of its molecular weight; as, acetylene and benzene. See *polymerism*. p. dialdehyde See *starch dialdehyde*.

polymericular weight The molecular weight of a polymer.

polymeride Polymer.

polymerisation Polymerization.

polymerism The property of certain organic compounds which have the same percentage composition, but different molecular weights, the heavier being multiples of the lighter.

Hawley's

Condensed Chemical Dictionary

Fourteenth Edition

Revised by

Richard J. Lewis, Sr.

JOHN WILEY & SONS, INC.

polyisobutene. See polybutylene.

polyisobutylene. See polybutylene.

polyisocyanurate. See isocyanurate.

polyisoprene. $(C_5H_8)_n$. The major component of natural rubber, also made synthetically. Forms are stereospecific *cis*-1,4- and *trans*-1,4-polyisoprene. Both can be produced synthetically by the effect of heat and pressure on isoprene in the presence of stereospecific catalysts. Natural rubber is *cis*-1,4-; synthetic *cis*-1,4- is sometimes called synthetic natural rubber. *trans*-1,4-polyisoprene resembles gutta-percha. Polyisoprene is thermoplastic until mixed with sulfur and vulcanized. Supports combustion. See rubber, natural; rubber, synthetic; catalyst, stereospecific.

"Polylite" *[Reichhold].* TM for a group of 100% reactive alkyd resins, dissolved in styrene and other monomers. Highly diversified applications both alone and in combination with such materials as fibrous glass. This group also includes resins for use with diisocyanate to form rigid or flexible polyurethane foams.

"POLYMEKON" *[Baker Petrolite].* TM for a dispersion

polymer. A macromolecule formed by the chemical union of five or more identical combining units called monomers. In most cases the number of monomers is quite large (3500 for pure cellulose) and often is not precisely known. In synthetic polymers this number can be controlled to a predetermined extent, e.g., by short-stopping agents. (Combinations of two, three, or four monomers are called, respectively, dimers, trimers, and tetramers and are known collectively as oligomers.) A partial list of polymers by type is as follows:

I. Inorganic: siloxane, sulfur chains, black phosphorus, boron-nitrogen, silicones
II. Organic
  1. Natural
    (a) Polysaccharides: starch, cellulose, pectin, seaweed gums (agar, etc.), vegetable gums (arabic, etc.).
    (b) Polypeptides (proteins): casein, albumin, globulin, keratin, insulin, DNA
    (c) Hydrocarbons: rubber and gutta-percha (polyisoprene)
  2. Synthetic
    (a) Thermoplastic: elastomers (unvulcanized), nylon, polyvinyl chloride, polyethylene (linear), polystyrene, polypropylene, fluorocarbon resins, polyurethane, acrylate resins
    (b) Thermosetting: elastomers (vulcanized), polyethylene (cross-linked), phenolics, alkyds, polyesters
  3. Semisynthetic: cellulosics (rayon, methylcellulose, cellulose acetate), modified starches (starch acetate, etc.)

polymer, addition. See addition polymer.

polymer, atactic. See atactic.

polymer, block. See block polymer.

polymer, condensation. A polymer formed by a condensation reaction.

polymer, coordination. A polymer made by organic addition, neither free radical nor ionic, using an organometallic catalyst.

polymer, electroconductive. A polymer or elastomer made electrically conductive by incorporation of a substantial percentage of a suitable metal powder (e.g., aluminum) or acetylene carbon black; the proportion used must be high enough to permit the particles to be in contact with one another in the mixture. Polyelectrolytes such as ion-exchange resins, salts of polyacrylic acid, and sulfonated polystyrene are electroconductive in the presence of water. Pyrolysis of polyacrylonitrile makes it electrically conductive without impairment of its structure. Polyacetylene and a few related polymers are made conductive by various doping agents such as arsenic pentafluoride and iodine.
See polyacetylene.

polymer eutactic. A tactic polymer completely devoid of any structural disorder along its chain.

polymer, graft. See graft polymer.

polymer, high. An organic macromolecule composed of a large number of monomers. The molecular weight may range from 5000 into the millions (for some polypeptides). Natural high polymers are exemplified by cellulose $(C_6H_{10}O)_n$ and rubber $(C_5H_8)_n$. Proteins are natural high-polymer combinations of amino acid monomers. The dividing line between low and high polymers is considered to be in the neighborhood of 5000 to 6000 mw. Synthetic high polymers (or "synthetic resins") include a wide variety of materials having properties ranging from hard and brittle to soft and elastic. Addition of such modifying agents as fillers, colorants, etc. yields an almost infinite number of products collectively called plastics. High polymers are the primary constituents of synthetic fibers, coating materials (paints and varnishes), adhesives, sealants, etc. Polymers having special elastic properties are called rubbers, or elastomers.
Synthetic polymers in general can be classified: (1) by thermal behavior, i.e., thermoplastic and thermosetting; (2) by chemical nature, i.e., amino, alkyd, acrylic, vinyl, phenolic, cellulosic, epoxy, urethane,